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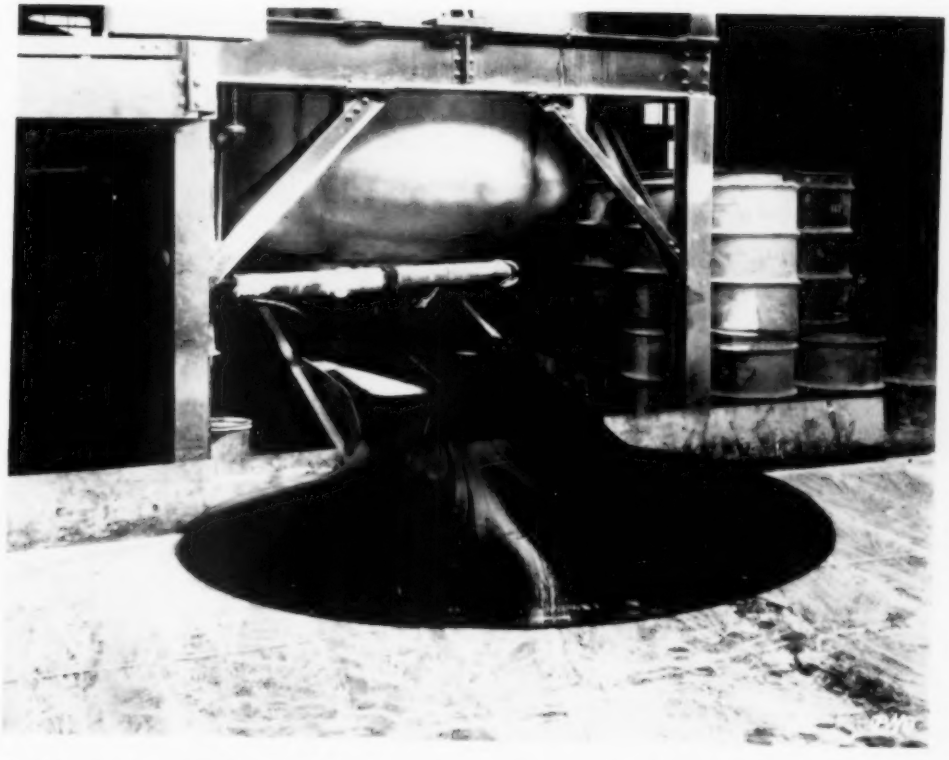

Freshly made phenol-formaldehyde resin being poured from the cooking kettle to the cooling floor. Photo courtesy of Durez Plastics and Chemical Co.

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JOURNAL

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The Society of Plastics Engineers Journal is not responsible for the views expressed by individual contributors. All material submitted must be received not later than the fifth of the month for publication in that month. Communications should be addressed to Dr. Jesse H. Day, Society of Plastics Engineers Journal ,Athens, Ohio.

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New York — January 18-20

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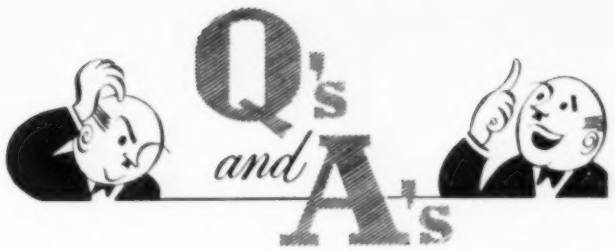

Members—if you have information to aid in either case below, write now to the SPE Journal, 409 Security Bank Bldg., Athens, Ohio.

Gentlemen:

We hope you will be able to help us in our search for the manufacturer of a molded-plastic, snap-fit, two-section Christmas ornament we'd like to show in our 1951 Fall Catalogs and Flyers.

This ornament is made in two sections. The top section is a colored piece and snaps to the lower half which is made of clear plastic.

We've seen this ornament as described, hand painted with a child's name and filled with candy to be hung on a tree.

The ornament measures about 3¼" in diameter, but we'd be happy to have it in a slightly larger size if it is available.

Any details as to where we can locate the manufacturer of this ornament will be greatly appreciated. Thank you.

(Signed) Miles Kimball Co.

Gentlemen:

We manufacture a large variety of plastic molded products. We are now interested in obtaining the technical know-how of mass production of metallizing by metal evaporation (vacuum) or silver reduction (silver spray).

Our plans are to set up this program in the very immediate future, and would like to know if you are in the position to offer us any material assistance in obtaining the desired results.

Thanking you for your interest and attention to the request, we are

Very truly yours,
GREAT AMERICAN PLASTIC CO.

POSITIONS OPEN

PLASTICS ENGINEER—To function as General Foreman in plant manufacturing Thermo-setting articles used in the electric appliance field. Minimum of two year's experience required. State age and experience in letter addressed to S.P.E. Journal, 409 Security Bank Bldg., Athens, Ohio.

BUSINESS OPENING FOR PLASTICS CHEMICAL ENGINEER—Must know materials for plastics, plastics chemistry, and direct program of materials recovery from scrap material. Opportunities unlimited for advancement. Box 7, S.P.E. Journal, 409 Security Bank Bldg., Athens, Ohio.

WANTED INJECTION MOLDING DEPARTMENT FOREMAN, in Newark, N.J. area with at least five years experience to supervise a modern machine setup. Reply stating age, experience and salary expected to Box 23J, SPE Journal.

THE *Injection* MOLDERSCOPE

BY A. R. MORSE

Ren Morse, ebullient and highly effective SPE worker for many years, initiates with this issue what we hope to be a regular feature. He is one of the best informed authorities on injection molding in the country. You may or may not always agree with him—but you will agree with us that he provides the liveliest writing to be found in any plastics magazine.

This month: Injection Molding Materials.

The short term: Platitude—The supply for styrene is tight, but it is going to remain so for the immediate future despite optimism here and there. Even if production handicaps are overcome, demand is going to be temporarily inflated by rebuilding of normal inventories, new applications and new injection machine capacity. Prices will remain at or above present levels for the immediate future. (I can see no long term relief yet either in price or supply—see below.)

Polyethylene and vinyl will remain tight and get worse as the war program deepens. Other materials will remain tight with prices at or above present levels as components are diverted to other uses **before** we get a crack at them, whether it be wire covering or paper. The sulfur shortage will directly affect us as well.

Under the "voluntary" allocation system molders are taking every pound of material offered them even if only to keep their 'use-record' up, even though this ties up a risky amount of working and other capital. However, I suggest continuing to take every pound allocated. You won't lose money on it, and you will keep your use-record up—vitally important in the present double economy (war: peace) where private industry allocates scarce material after filling government orders.

Some—I might say ample—materials are available on the gray market at inflated levels (eg. 70-80c lb. for acetate), but I would not suggest taking these materials except for specific jobs. Quality in some cases has not been up to par, and speculation—if we risk it—will only invite individual complaints and general controls, and give the bureaucrats the excuse they need to place the injection industry under "emergency" regulation.

The trend to dry coloring is being encouraged, and is helping both the material companies and the injection molder. Investigation of the process is urged if you are not already using it. The dry coloring method will soon be applicable to any and all thermoplastics in any and all colors. Keep in touch with the pigment people—they are pushing the program to extend and perfect dry coloring really more than the material people.

The Longer Term: Injection molders are unfortunately tied to the tail of the national economy. I do not look for the large committee trying to relieve the injection molder's plight to have any great success. Eventually someone will look under our howls of misery and see the miniscule percentage of injection work issuing from the war program as compared to compression, laminating, film and wire covering etc. They will rule against us no matter who suffers. We will get some war work, but not much in comparsion to our total capacity—not even as much as in World War II when our capacity was much less.

In the move to keep our civilian economy running at its present level while also taking care of World War III production (a long chance in view of basic shortages discussed below) our industry has a chance of muddling through with around ⅓ to ½ of its machines busy. If the all out for war attitude prevails, there will certainly be the casualties predicted by the injection industry protective committee. There will be almost no way to avoid these disasters outside of strictly charitable allocation by the bureaus. Howl loud and long this spring—it's the industry that squeaks the loudest that will get the allocated "oil" here in the spring of 1951, while the channels of bureaucracy are still in a state of flux and the boys in the Washington hot seat are still trying to please everybody.

Keep after the committee members. Its a big committee, but write them one and all facts they can use—number of people dependent on your operation is a big factor, utility of your products is another. Play the human angle, not what you stand to lose in investments etc., as it will be fear of your vote not your dollars that will help hold back the disaster that diversion of our basic molding powder components to the wastes of war could bring.

Watch one thing: if we are outsmarted by Russia in the matter of Asia, and our remaining basic assets (like benzene) are funnelled into the bottomless Chinese sump, nothing can prevent—not even a politician profoundly moved over our plight—nothing can prevent the indicated disaster for at least ⅓ of the so recently expanded injection industry. If the US builds an iron curtain of our own around the Far East to contain it, but mainly to prevent our wealth from being drained off into China as Russia hopes will happen, we can hope for a nearer normal long term picture. But if we try to blow up and then re-build the Far East—look out. We can't do it and keep our injection machines running. Injection molders are 100% dependent on synthetics which will NEVER be generally available enough to make an "our town USA" out of the yellow wastelands.

No committee of injection molders can stem such a tide of material as Russia hopes to draw off this country. They can only beg a beggar's share of what is left—and it won't be much. Nor will we get much endorsement from the armed forces for our products in comparison to our capacity. So with a miserable share of thermoplastic, plus a limited demand for war products, look for World War III to be grim and long. The politicians have yet to learn what Dr. Thiesen taught us last year—that when a country runs out of something (in our case benzene) somebody is going to suffer. When our committee reaches into the national grab bag they are likely to find that others have been there first—so keep the heat on them.

Section Notes

The **Upper Midwest** Section heard James E. Corbin, Manager, Technical Service, Tape Division, Minnesota Mining & Manufacturing Co., discuss "Plastics in the Tape Industry" at their meeting on Monday, December 11. Mr. Corbin is an outstanding authority on pressure sensitive tapes, having been in the tape business for a number of years and being responsible for many of its developments.

Mr. Wyman Goss spoke to the **Rochester** Section on "Rubber-Phenolic Molding Materials" at their meeting on December 11. Mr. Goss is with the General Electric Co. and is well qualified to discuss this problem as a continuation of a series started at the previous section meeting.

The **Rhode Island** and **Southeastern Massachusetts Section** heard Shaw Goldthwait discuss "Quality Control" at their December 13th meeting which also featured the film, "Wonderland of Vision" which was donated by Mark Peters of Nixon Nitration to the Society.

The **Eastern New England** Section met with the local S.P.I. group to hear Arloe R. Olson, Manager of Plastics Promotion, Hercules Powder Co., discuss "Phases of Development of New Plastics" and William Cruse, Executive Vice-president of S.P.I. discuss "Polystyrene Shortages." The meeting was held at the Hotel Bellconfield in Boston on December 7.

POLYETHYLENE — Properties And Uses

BY GEORGE BLUM

Case Institute of Technology
Cleveland, Ohio

FIRST PRIZE 1950 *SPE* PAPER CONTEST

Processing conditions of many industrial chemical operations impose severe restrictions upon the choice of the proper materials of construction to be employed. The transfer and storage of corrosive chemical solutions require a careful inquiry into the degree of resistance of a wide variety of fabricating materials. Even during the war-born shortages accelerated by the unusual demand for combat material, only a very limited and occasional use was made of polychylene and the vinyl resins in the chemical processing fields. In contrast, the growth and development of the German plastics industry occurred at a rapid rate long before the outbreak of hostilities, since the shortages of strategic metals had been foreseen for a considerable time. The impetus of war placed upon the American, British, and German plastics industries an urgent need to develop "ersatz" or substitutes for the metal alloys formerly used. The specific duties performed by many of these new plastic materials proved that many of them possessed superior properties, could be made more cheaply, or could be prepared from raw materials sources more readily available or less subject to depletion. Polyethylene shows considerable promise of increased utility in processing equipment, particularly for the protection it affords from chemical corrosion and degradation of processing equipment in the flow cycle.

Corrosion resistance of plastic materials to chemicals is the result of phenomena entirely unlike the corrosion control of metal materials. The latter is contributed to largely by the occurrence of electro-chemical reactions, as well as by the prevalence of mechanical stresses and strains in the structure of the metals. When metals corrode due to the action of solutions or the exposure to gaseous media, a chemical change invariably occurs by oxidation-reduction mechanisms, producing increasing rates of metal deterioration. Unlike metals, the effect of chemicals on plastic materials is seldom due to chemical reaction, except in the case of strong oxidizing agents such as nitric acid or the halogens. Thermoplastic resins in particular are normally attacked by the physical processes of solvation in, and by the penetration of, liquids and gases into the plastic material. A marked increase in weight due to swelling is produced with an accompanying decrease in strength and elongation. In some cases the resins may be completely soluble in the liquid. Most of these detrimental effects increase sharply with increasing temperature.

Polyethylene is a thermoplastic resin produced by the high pressure, elevated temperature polymerization of ethylene, produced in considerable volume from the cracking of petroleum streams or from the dehydration of ethyl alcohol. The resin is essentially a tailor-made paraffin wax of a melting range higher than that normally obtainable from natural sources. Originated and disclosed by the Imperial Chemical Industries, Ltd. of England in 1933, few commercial applications were in use before 1940. The British process, adopted in general details by American industrial practice, employs pressures of 1000-2000 atmospheres at temperatures of 180-200°C. The process involves mass polymerization catalyzed by 0.05%-0.10% active oxygen. The effective yield is 93-98%, and the yield per pass is 8-15%, when recycle operation is employed. The I. G. Farben Co. developed a low pressure, solvent type process employing a benzoyl peroxide catalyst suspended in methanol. Operating under conditions of 200-300 atmospheres at temperatures of 100-120°C. by pump circulation through a tube coil, low melting point wax products were made in molecular weight ranges of 2000-3000. The possible applications were limited for these materials, in contrast to the many uses for the 15000-20000 molecular weight products of the ICI high pressure techniques. Additional details of these processes have been published. (1, 2, 3, 4, 5) A recently disclosed process for the polymerization of ethylene claims a method of producing resins having softening temperatures of 100°C to above 200°C. (6) Operating at a pressure of not less than 4000 psi nor more than 10000 psi and at temperatures of 35°C to 65°C, catalysts such as peroxydicarbonate esters are employed to accelerate the rate of polymerization.

The design engineer charged with the responsibility of choosing materials of construction for specific processing must have a clear understanding of the chemical and physical properties of the materials under consideration. The following data have been assembled from numerous sources of published and unpublished research.

Physical Structure

Polyethylene is a microcrystalline plastic which contains a limited amount of amorphous material. In an unoriented condition below its melting point, it is essentially a randomly distributed crystallite. When it is oriented by subjection to tensile stress beyond its critical range, irreversible orientation and elongation take place, and a tensile strength of about 2000 psi is obtained. No sharp melting point can be obtained, but transition to the amorphous state occurs within a flow range of 130°F to 200°F. The initial temperature of flow and magnitude of the flow range depends upon the molecular size of the resin used. Above 250°F-275°F the resin is essentially an amorphous liquid.

The mechanical, electrical and thermal properties of the most widely used type of industrial product (average molecular weight of about 18000) appear in Table 1. (12), and Table 2 shows the variation of the thermal properties as a function of temperature.

Examination of the tensile and elongation data shown in Table 3 for flame sprayed polyethylene sheets presents quantitative evidence of the increased flexibility obtained by the rapid cooling of the film by water quenching. Slow cooling from the liquid state results in the formation of large crystals, while rapid cooling produces smaller crystals. Polyethylene requires no plasticizer; the zinc stearate was used as a lubricant for the flame spray gun.

The permeability of polyethylene for a large number of polar materials at room temperature is shown in Table 4. (9) Good resistance to the transmission of polar type solvents can be noted, and polyethylene is generally superior in resistance to the non-polar and chlorinated solvents. (10). In general the rates of transmission of various non polar solvents are about inversely proportional to the film thickness and are an exponential function of the temperature. The transmission rate is approximately doubled with an increase of 10-15°C. for a given film thickness. The diffusion of water vapor through plastic sheet, determined in accordance with ASTM D697-42T, has demonstrated that the diffusion constant

Table 1

Physical Properties of Polyethylene

Properties	Average Test Values
Flow Temperature, °C.	106
Deformation under Load - %	
122°F.	0.6
158°F.	0.8
Heat Distortion Temperature	
Low load - °F.	107
Specific Heat - cal gm./°C. (25°C.)	0.55
Coefficient of linear expansion per °F. - 77°F.	9×10^{-5}
Thermal Conductivity - BTU/hr./ft²/°F./inch	2.15
Tensile Strength, psi.	
70°F.	7,600
77°F.	1,900
170°F.	1,000
Elongation - %	
70°F.	50
77°F.	600
170°F.	575
Modulus of Elascticity - % psi.	
77°F.	13,000
Stiffness, psi.	
40°F.	130,000
77°F.	13,000
160°F.	5,000
Impact Strength, Izod - ft. lbs./in.	
70°F.	0.44
77°F.	did not break in
170°F.	4ft.-lb. machine
Rockwell Hardness, average	R36
Dielectric strength, short time, v/m (0.125")	460
Durometer Hardness	A98, D45
Volume Resistivity ohm cms.	greater than 10^{13}
Tear Resistance lbs./inch of thickness	570
Dielectric constant 60 cycles	2.3
10^3 cycles	2.3
10^6 cycles	2.3
10^8 cycles	2.3
Temperature stability	excellent
Power Factor 60 to 10^8 cycles	less than 0.0005

Table 2

Thermal Expansion Characteristics. (7)

Temperature °C	Linear Expansion Coefficient x 10^5	Cubical Expansion Coefficient x 10^6	Specific Volume Ratio V_T/V_{-}
35	10.0	300	0.969
20	13.7	410	0.975
0	18.3	550	0.986
20	23.7	710	0.997
25	24.8	745	1.000
40	29	870	1.012
60	33.7	1010	1.031
80	40.3	1210	1.055
100	46.6	1400	1.094
110	51.0	1530	1.130
115	25.0	750	1.142
150	25.0	750	1.168

Table 3 (8)

Tensile and Elongation Data of Polyethylene at a rate of pull of 20" per minute

	Sample	Thickness, in.	Elongation %	Tensile psi.
1A	Standard Clear	0.103	120	1010
B	Resin	0.112	100	1000
C	Slow cool	0.110	100	1000
2A	Standard Clear	0.072	210	880
B	Water	0.076	250	870
C	Quench	0.072	250	820
3A	Standard Clear	0.085	130	830
B	with 0.5%	0.088	180	850
C	ZnStear. Water Quench.	0.082	180	840
4A	Standard Clear	0.077	230	910
B	with 1.0%	0.083	220	925
C	ZnStear. Water Quench.	0.085	200	925
5A	Standard Blue	0.087	280	1000
B	Water Quench.	0.081	260	1000
C		0.086	270	960
6A	Standard Blue	0.077	250	1000
B	0.5% ZnStear.	0.075	250	1000
C	Water Quench.	0.071	250	1000
7A	Standard Blue	0.073	130	980
B	1.0% ZnStear.	0.074	110	970
C	Water Quench.	0.075	80	980
8A	Standard White	0.083	200	960
B	0.5% ZnStear.	0.094	230	900
C	Water Quench.	0.097	180	880

Table 4

Permeability of Polyethylene To Polar Materials

Material	Permeability gms 24 hr./100 sq. in. for film 0.001" thick at room temp.
ethylene glycol	0.02
2 nitro 1 butanol	0.05
dimethyl phthalate	0.09
water	0.16
hydrogen peroxide 30%	0.33
formic acid 85%	0.48
Old Spice cologne	0.60
n-octyl alcohol	0.68
phenol 94%	0.70
ethylene chlorohydrin	0.73
allyl alcohol	0.95
n butyl alcohol	1.2
acetic anhydride	1.3
methyl alcohol	1.6
ethyl aceto acetate	1.8
nitroethane	2.0
nitro methane	2.1
aniline	2.4
nitrobenzene	2.6
glacial acetic acid	2.6
acetone	7.6
methyl ethyl ketone	15
ethyl acetate	21
propionaldehyde	25
dimethyl aniline	27
pyridine	29
acetyl chloride	38
mono chloro benzene	38
butyl acetate	40
o-dichloro benzene	59
ethylene chloride	79
dibutyl ether	200
diethyl ether	410
ethyl bromide	680
chloroform	720

Table 5 (8)

Taber Abrasion Test on Polyethylene

Tabor Revolutions	Weight in grams of test specimen
0	13.9969
500	13.9726
1000	13.9557
1500	13.9408
2000	13.9283
2500	13.9157
3000	13.9047
3500	13.8920
4000	13.8830
4500	13.8753
5000	13.8654

American Hydrotherm Corporation announces the removal of its offices and shops to 33-70 Twelfth St., Long Island 6, N. Y.

P for polythene is 0.2 x 10^{-8}, in comparsion with 3.5 x 10^{-8} for polystyrene, 4.1 x 10^{-8} for polymethyl methacrylate, and 77.0 x 10^{-8} for ethyl cellulose. (11) Of especial importance is the abrasion resistance of polythene coatings. Table 5 summarizes data obtained on a sheet of spray coated and stripped resin, of DuPont PM1 resin, average molecular weight of 18000 to 19000, in a sheet thickness of 0.060" to 0.070". A Taber abrasion apparatus, employing a Norton grinding wheel medium coarse, rubber base, showed that in 5000 revolutions at room temperature, only 0.132 grams was abraded from a 14 gram sample. The high impact resistance shown is also significant; in contrast with porcelain, glass, or many other more rigid lining materials. Defects such as blisters or pinholes which may form during the coating operation may be corrected by the application of an iron heated to 500 F. to melt the resin surrounding the flaw and thus close the defect.

The scope of industrial applications feasible will depend to a large degree upon the solution tendency and swelling effects of chemical reagents, as well as upon the degradation of mechanical and physical properties produced from processing contact with these reagents. The relative degree of chemical resistance to various types of chemical reagents is summarized in Table 6. (12) Satisfactory resistance to the following chemical reagents have been demonstrated in temperature ranges of room temperature to 140 F., although quantitative values are not available at this time.

Chromic acid
Citric Acid (Sat.)
Hydrofluosilicic acid
Sulfurous Acid
Sodium Chloride
Potassium dishromate 40%
Calcium hydroxide
Formic Acid (full range of conc.)
Phosphoric acid 30%-90%
Tannic Acid
Sodium Carbonate
Sodium Sulfate
Ammonium carbonate
Potassium hydroxide 0% to sat.
Hydrobromic acid
Lactic Acid 10% to 90%
Zinc Chloride
Zinc Sulfate
Aniline
Glycerol 50%
Hydrogen Peroxide 90%

The swelling of polyethylene resins produced by typical processing materials is shown in Table 7. (13).

Table 6 (12)

Effect of Chemical Reagents on Polyethylene—3 months Immersion

REAGENT	ON REMOVAL FROM REAGENT		24 HOURS AT ROOM TEMP. AFTER REMOVAL		
	% Change in Weight	% Change in Volume	Appear.	Tensile Str. psi Orig. 1500	Elongation % Orig. 500
H_2SO_4 conc.	+0.13	none	no change	1458	462
60%	+0.11	none	no change	1395	496
30%	+0.02	none	no change	1285	467
10%	+0.04	none	no change	1370	483
HCl 37%	+0.13	+0.4	no change	1406	258
10%	+0.20	+0.6	no change	1442	336
HNO_3 conc. 70%	+3.02	+1.1	no change	1093	71
10%	+0.22	none	no change	1387	325
Acetic, glacial	+1.44	none	no change	1278	263
10%	+0.11	none	no change	1473	327
HF 48%	+0.5	——	no change	Test carried out in polythene bottle	
Oleic acid conc.	+3.78	+1.9	sl. swell	1050	296
NaOH 50%	+0.13	none	no change	1432	313
10%	+0.14	none	no change	1345	354
NH_4OH conc. 28%	+0.31	none	no change	1375	371
10%	+0.33	none	no change	1604	450
Ethyl Alco. dena.	-0.02	+0.7	no change	1550	421
Ethyl gasoline	+11.75	+4.7	swollen	1430	508
Acetone	+0.03	none	no change	1363	379
ethyl acetate	+2.76	1.5	sl. swell	1295	325
Methyl Isobututyl ketone	+3.56	+2.0	sl. swell	1380	450
Butyraldehyde	+3.06	+1.0	no change	1295	417
Carbon Tetrachloride	+22.35	+7.7	sl. swell	1560	475
Benzene	-0.86	——	no change	1464	429
Ethylene dichloride	+0.80	+2.5	no change	1526	300
Xylene	-0.70	——	no change	1623	479
Dioxane	+0.38	+2.2	no change	1368	382
Linseed Oil	+0.88	none	no change	1410	483
Lubricating Oil	+7.54	+2.3	sl. swell	954	167
Sod. Bisulfite 10%	+0.17	+2.0	no change	1380	483
Cal. Chloride 15%	+0.07	none	no change	1380	483
Cal. Hypochlorite	+0.06	none	no change	1330	375
Trichlorobenzene	+26.33	+4.2	swollen	1450	442
Triethanolamine	+0.08	none	no change	1408	379
Camphor oil	+17.42	+7.8	swollen	1375	483
Ferric sulfate 15%	+0.02	+0.06	no change	1307	467

Table 7

	Swelling Index at 60°C. % Change in Volume of DYNH Polyethylene at Equilibrium.
Silicone Liquid, Visc. 350 cstk. 25°C.	0.30%
Visc. 1000 cstk. 25°C.	0.20
Methanol	Negl.
Acetone	Negl.
Water	Negl.
Lactic Acid	0.015
Propylene Glycol	0.13
Turkey red oil	0.30
Dimethyl "Carbitol" phthalate	0.35
Dimethoxy ethyl phthalate	0.36
Linseed oil	0.45
Soya bean oil	0.65
Castor oil	0.65
Diethoxy ethyl phthalate	0.75
Ethylene glycol monoethyl ether	0.95
Tricresyl phosphate	1.3
Butyl Cellosolve	1.7
Dioctyl phthalate	4.5
Dibutyl sebacate	6.1
methyl ethyl ketone	6.4
Trioctyl phosphate	6.6
Mineral Oil Socony No. 309	8.7
Silicone liquid, 0.65 cstk. 25°C.	9.5
Methyl isobutyl ketone	10.3
hexyl ether	18.5
Xylene	19.5
Chloroform	21
Butyl ether	22.6
Benzene	23
Dichlorobenzene	26
Tetrahydronaphthalene	36

One of the principal chemical limitations of polyethylene resins is their tendency to oxidize and degrade in physical properties due to oxygen deterioration. It is normal to expect that long chain paraffin polymers of this type will exhibit little resistance to oxygen attack; this limited resistance has been demonstrated by oxygen absorption techniques at 90, 100 and 110°C. (8) Lubricating oils of high paraffin content have always exhibited little resistance to sludge formation due to oxygen attack. Pross and Black (24) have shown that polythene of 11000 to 22000 molecular weight, on exposure to bright sunlight, undergoes embrittlement and degradation of electrical and mechanical properties. They believe it to be due to photo-catalyzed oxidation. The ultra violet absorption spectrum shows that the attack is probably due to the presence of carbonyl groups

as an impurity in the polyethylene. By infra red absorption spectrum before and after irradiation, the presence of hydroxyl, carbonyl, and carboxyl groups have been established. It is requisite that suitable antioxidants such as phenyl beta naphthyl amine and others be incorporated into the resin prior to use to prevent, or at least inhibit, the hardening and embrittlement of the film and the impairment of its properties.

Methods of Industrial Application:

Polyethylene may be employed for industrial applications in the following forms: (1) solution, (2) emulsion, (3) flame spraying, and (4) welded sheets and contour material. Solution applications are extremely limited due to the relatively low solubility. Only chlorinated and aromatic hydrocarbons at elevated temperatures will produce effective concentrations of solutions.

Of the many polymer resins applied as protective coatings in emulsion form, polyethylene has shown least favorable results or promise of wide usage. Due to the porosity and sponginess of the deposited film, emulsion applied resins fail to possess the resistance to penetration or corrosion obtainable by the same resins applied in other ways. Problems of adhesion arise with many types of surfacing materials when the emulsion method is employed. Due to its waxlike nature the surface of polyethylene particles does not wet, and the presence of non-polar wetting agents in substantial amounts seriously degrades the character and properties of the film. Stable emulsions are difficult to obtain, and baking of the coated articles is necessary to obtain a continuous film.

Polyethylene has been successfully flame sprayed in fine particle size on surfaces of aluminum and its alloys, all types of steel and stainless steel alloys, bronzes and copper, (10) as well as on large concrete surfaces. (14) Research applications have been attempted on molecular ranges of 7000 and lower, as well as on 34000 to 38000, although standard applications normally utilize 12000 to 18000 molecular weight resin. The flame-spray process was originated in Germany where polyvinyl chloride was used, and was used in England for applications of polyethylene. Improvements in the process were developed by DeLong and Peterson of the E. I. Du Pont de Nemours Company which have found many industrial uses by the American Agile Company of Cleveland Ohio. (15) A smooth and continuous surface is produced, uniform in thickness, which has the same chemical and physical properties as molded or extruded resin. The Wheeling Steel Corp. Wheeling, W. Va. has recently announced a process for application of polyethylene liners of various thicknesses of both high and low molecular weight material. (25).

The resin used must be of uniform, spherically shaped particle size of 60-80 mesh. A spray gun has been designed such that the metal surface may be preheated with the flame alone to the desired temperature, followed by an uninterrupted flow of the resin through the same gun nozzle. In order to obtain adhesion of the flame sprayed resin, the metal surface should be uniformly clean and roughened with an emery disk, sand blasted or shot blasted. Too coarse a degree of roughening is undesirable. The surface should be preheated to about 400°F. prior to application of the resin, either by oven heating or by use of the flame gun with the by-pass for admitting excess air adjusted to obtain about a three inch flame. Either thermocouples or Tempil-sticks may be used in determining the temperature of the metal surface; the use of a small amount of strontium salt in the 0.5% stearate lubricant gives a variable intensity red coloration indicative of the surface temperature. The thickness of the sprayed film depends upon the powder supply, the flame, and the hand movement of the gun. Constant overlapping of the deposited film aids in the continued fusion of the resin to the desired thickness, but care must be taken to avoid local overheating of small areas. The porosity of the finished film may be tested by a high frequency spark tester delivering 30000 to 60000 volts; any point of surface penetration is indicated by a spark. Thickness of the resin deposit may be measured by an alternating current magnetic thickness tester, preferably the Marconi type described recently. (16). Graphite modified polyethylene coatings have been found to be porosity free with a 30000 volt spark test, and exposure tests of a year's duration have indicated little attack on the base metal or deterioration of the resin. Successful application of flame spraying of polyethylene to large concrete surfaces has been demonstrated to offer resistance to a mixture of methyl ethyl ketone and 10% nitric acid. The surface of the concrete was flamed with an oxy-propane or oxy-acetylene torch. Four tenths of a pound of polyethylene per square foot of surface was flame sprayed, in about four minutes. All pinholes, blowholes, etc. were repaired by melting in the coating around the defect with an iron heated to 500°F., followed by another flame spray to produce a uniformly smooth surface. Glazing or polishing of the surface may be accomplished by passing the gun over the coating without the use of additional powder, but care must be used to avoid smoking and burning of the resin.

An interesting application of polyethylene coating is the prevention of precipitation static on the external surfaces of radio parts. (19) When a plane is flying in or over precipitation areas, disturbances occur in the reception of communication, seriously hampering the sending and receiving of messages. This precipitation static is not experienced when polyethylene coatings are used.

The hot gas welding of polyethylene has been recently reviewed in some detail. (18) Originally developed for Saran (polyvinylidene resins) by Dow Chemical Company, (19) it is now licensed to the American Agile Company of Cleveland, Ohio for industrial use. A subsequent patent (20) covers the use of butt weld straps and a roller for smoothing the weld. The welding process utilizes a hot gas, flameless torch in which nitrogen gas is heated by passing through an electrically or gas heated coil to a temperature of 400° to 600°F. A filler strip, or spline, of plastic is fused into the joint to produce a bonded, integral weld. The techniques required are fully described in the patent. Welding makes possible the construction of plastic assemblies of considerable complexity of design and detail, in shapes not otherwise obtainable, as well as effecting the repair of damaged plastic equipment. Complete reactors, valves, and miscellaneous units of large size are possible; the former may be supported, if necessary, by a framework or enclosure of less resistant materials. Buckets, pipes, valves, manifolds, vats, and tank liners have been readily fabricated. Due to lower temperatures of fusion and the somewhat higher cost of most resistant alloys, costs have been cited as competitive, or somewhat lower than metal welding.

Many new industrial applications of polyethylene have recently been developed. Polyethylene monofilaments which have been extruded, oriented, annealed and wound, have been developed by the Reeves Brothers Inc. and the American Viscose Company in 1949. (26a) No particular difficulties have been encountered in the weaving of the monofilaments, and following a finishing operation of cold calendering, heat treatment and annealing, a non-moisture absorbing, light stable, wear resistant fabric is produced which possess less than 1% shrinkage at 165°F. Polyethylene molding powders are now obtainable in metallic colors in eight different brilliant shades. (26b) New methods of continuous sealing of polyethylene film utilize a specially prepared finish containing fine particles of Teflon (polytetrafluorethylene) resin, which, after fusing at 750°F., will provide metal surfaces with a non-sticking coating. Announced by Du Pont, (26c) speeds of sealing up to 100 feet per minute are claimed.

Conclusions:

The favorable characteristics of electrical properties, chemical resistance, low water absorption and trans-

mission, and ease of handling, indicate many unexplored areas of industrial application and customer acceptance. The most note-worthy limitations which retard its more widespread use are its limited resistance to oxygen deterioration and its relatively low temperature and pressure flow range. Bostwick and Carey, (27) have found that the use of inorganic fillers such as silica, clay, calcium carbonate and the like will increase the stiffness of DYNH polyethylene resin approximately 100% when used in about 40% concentration by weight. The fillers reduced the tensile strength, tear strength, and ultimate elongation, as well as raising the brittlement temperature. Such additions are mixed blessings, and can be employed only under specific conditions. Studies must be undertaken to obtain surfaces resistant to flow at temperatures of at least the boiling point of water if wider industrial fields of application are to develop. The cost of the resin continues high and availability increasingly limited. The high cost of constructing and operating plants to operate at the high pressures required limit the number of competing companies. Flame spraying provides a means of corrosion protection for drums, tanks, and reactors which will increasingly compete with the more costly zinc, lead, and ceramic linings as well as the high alloy stainless steels. When combined in the processing flow line with valves, pipes, and receivers fabricated entirely from polyethylene by welding, higher purity of chemical products free from corrosion contamination can be looked for. Much can be learned from the experience of the older art of metal spraying, (22) which has been successful in industry for many years. Additional areas of industrial acceptance will no doubt develop in the already accelerated field of packaging. The handling and processing involving hydrofluoric acid, an extremely corrosive material to most metal or nonmetal containers, has been very successful with polyethylene containers. The shipment of monochloracetic acid, anhydrous calcium chloride, and many medicinal products has also been accomplished more favorably by this means. Translation of the procedures employed for vinyls and polyethylene to the more chemically resistant Teflon and KelF is now under research study.

Acknowledgement. The writer wishes to acknowledge the information and other courtesies given him by Dr. J. A. Neuman, Director of Research of the American Agile Company of Cleveland, Ohio.

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CASSIDY AT COX

Cox Plastics Corp. and Atlas Plastics, Inc., both located at 162 Colgate Avenue, Buffalo 20, New York, have announced the appointment of **J. Clarke Cassidy, Jr.** as Technical Representative.

Klippings From Kozy

BY WALTER KOZY

Chrysler Corp.

The annual Christmas party of the Detroit Section of the SPE was held on Dec. 18, at the Sheraton Hotel. A large crowd turned out for cocktails and dinner and stayed on into the small hours of the morning, celebrating the conclusion of another successful year for the Detroit group.

The results of the annual elections were announced at the meeting. The three new directors elected were Jack Totten, Ford Motor Co.; Ray Richards, Bakelite Corp.; and Walter Kosy, Chrysler Corp. They will replace the following members whose terms have expired: Dr. Ernest Storfer, Chrysler Corp.; John Mickey, Ford Motor Co.; and Carl Holmes (whose term was being completed by W. R. Kosy.)

It was also announced that the new board of directors elected the following officers to lead the Detroit Section in the coming year: President, Al Stomp, Una-Craft Engineering; Vice-President, Jack Totten, Ford Motor Co.; Treasurer, Walter Kosy, Chrysler Corp.; and Secretary, Ray Richards, Bakelite Corp.

Jack Totten, Chairman of the Prize Paper Contest Committee revealed that the first prize winner in the Detroit Section Prize Paper Contest was (ahem) Walter Kosy, Chrysler Corp. Title of his paper was, "The Vacuum Forming of Plastics." The prize, a $50 Savings Bond, was presented to the winner and the paper was forwarded to Bess Day for entry in the national contest.

If you haven't seen Josh Miller lately it's because he hasn't been around for the last three or four months. Josh resigned his job as sales representative for Durez in September, and headed for Arizona with his family for a well-earned vacation. His future plans have not been announced but rumor has it that he has located with a large material supplier in the East whose name begins with M. We'll tell you more about it when the official publicity is released. Josh was President of the Detroit SPE in 1947.

Carl Whitlock, Associates have moved their offices to 16267 James Couzens Highway, Detroit 21, Mich. Reports from Carl Whitlock and Mary Denny, principals in the company, indicate that the increased room and facilities will result in better service for their customers. The firm represents the Jo Davis Plastics Company in plastic sheet stock and Gering Products Co. in plastic molding powders.

The first 1951 meeting of the Detroit section will be held on January 26 at the Rackham Memorial Building. Featured on the program will be Wayne Schrag of the Gering Pro-

(Continued on page 12)

SPE EDUCATION COMMITTEE MINUTES OUTLINE PLANS, PROBLEMS

BY. JAMES M. CHURCH

The three main problems confronting the committee at this time were outlined by Dr. Church. (1) Promotion of the S.P.E. educational program through the local sections. (2) The accrediting of the curriculum. (3) Assistance to educational institutions desirous of starting programs in Plastics. The S.P.E. educational program is already well organized and our primary job now is to promote and sell it.

The minutes of the last meeting were read by the secretary and the following correction was approved. The last sentence of the first paragraph should read "The State University of New York has used the S.P.E. brochure as a guide in the planning of their program."

Agenda

(1) Cooperation with local sections of S.P.E. in conducting a forum on the subject, "Training of the Plastics Engineer."

Dr. Church reviewed the reasons for holding these meetings. (1) Publicize the S.P.E. educational program. (2) Find out what training employers feel the plastics engineer should have. (3) The opinion of students and future students on what training they need.

Mr. Wehmer described a meeting he and Mr. Holtby conducted at the November meeting of the Upper Midwest Section. The meeting was most successful in promoting discussion of educational problems by both industrial representatives and students. Such questions as the ideal background for plastics engineers, the usefulness of plant trips and the feasibility of work study programs were discussed.

Dr. Church announced that the Newark Section had been asked to hold an educational meeting. Due to changes in personnel in the Newark section these negotiations will have to be reinitiated. Mr. DuBois said that he planned to contact the Western New England section following this meeting of the committee, with a similar objective of holding an educational forum or meeting.

It was decided that we should apply to the President of the S.P.E. for an opportunity to describe the committee's work and objectives to the National Council at the annual meeting. We should also apply for one hour on the program of the National meeting to present a forum on education. The objectives would be to find out what industry believes the best training for plastics engineers should be. Mr. Rahm was asked to suggest two men to represent the typical plastics engineering graduate and Mr. DuBois was asked to select two men to represent industry on this forum.

(2) Cooperation with the National Meeting Chairman for the formation of a technical symposium to include fundamental studies in plastic technology as part of the national meeting program, or at a separate meeting of the society.

Dr. Church contacted the National Program Chairman and found that the Program Committee is in favor of such a symposium to enhance the prestige and publications of the Society. Unfortunately it is too late to hold such a symposium at the coming meeting. It was decided that the formation of a symposium committee should be brought up before the Council at the annual meeting. It might be necessary to hold this symposium concurrently with the regular annual meeting programs.

(3) Recognition, with acceptance by proper accrediting bodies, of the Educational Program of the S.P.E. Since the accrediting societies have as yet been unable to decide on a curriculum for graduate programs much work must be done before we can expect action. It will first be necessary to promote the program at several schools. Dr. Church brought up the question of what schools now conduct plastics education. It was decided that a survey should be made. This would not only supply us with the desired information but would also stir up interest in the schools.

(4) The compilation of selected reference books and periodicals to be recommended as minimum library requirements for the plastics engineering curriculum.

The committee has received some requests for such a list. A possible solution to this problem could be found in a critical classification of the list in the Plastics Encyclopedia, but any list that included all the phases of high polymers would be too long.

(5) Other functions of the Educational Committee in the promotion of plastics education.

This topic was covered in discussion under (1) and (2). The problem now is to sell our program and to educate the society in the need for plastics education.

(6) An agenda item was added by Dr. Church. The replacement or reappointment of the four men whose appointments expire this year. Several suggestions were made by the members. The Committee members were requested to send to Dr. Church the names and addresses of people they would care to recommend.

Present for Meeting

J. M. Church	M. Olyphant, Jr.
J. H. DuBois	L. F. Rahm
R. C. Leonard	H. W. Rose
B. Maxwell	F. Wehmer
R. T. Nazzaro	C. C. Winding

FREDERICK AT MCA

The Manufacturing Chemists Association, Inc., in a special meeting held at the Union Club in New York, has elected **Dr. D. S. Frederick,** vice-president of Rohm & Haas Company of Philadelphia, to a newly created directorship.

Klippings (*from page* 11)

ducts Co., who will talk on, "The Coloring of Polystyrene." A movie on the manufacture of plastic eyeglass frames (courtesy of Nixon Nitration Works) will also be shown.

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PLASTICS IN DEFENSE WNE TOPIC

Hasenzahl, Nickerson, Crawford, Marciniak Elected

BY WESLEY S. LARSON

A meeting of the Western New England Chapter of the SPE was held December 6, 1950 at the Hotel Sheraton in Springfield, Mass. The results of the membership voting were announced with the election of Mr. Louis Peterson of the Prophylactic Brush Company, Florence, Mass.; Mr. Paul Homberg of Arrow, Hart and Hegeman Company, Hartford, Conn.; and Mr. Richard Thuse of the Monsanto Chemical Company, Indian Orchard, Mass. These men were elected to the Board of Directors. The new officers elected by the Board of Directors for the coming year were also announced. Mr. Herbert Hasenzahl has been elected President; Dr. M. H. Nickerson, Vice President; Mr. R. W. Crawford, Secretary; and Mr. Emil Marciniak, Treasurer.

The speaker of the evening was Mr. Edmund Childs of Monsanto Chemical Company who spoke on the present position of plastics in the defense program. Mr. Childs stated that the requirements are largely determined by the terrain in which we fight and that the present established limits are -65 to 165F. Another important military requirement is portability and great emphasis is placed on the weight of the equipment. An example is the problem of achieving a plastic molded rifle stock which must be fired at low temperatures and be light and tough. The Armed Forces have a tendency to distrust the application of thermoplastics for this particular use. Cellulosics in general do not withstand low temperatures. Cellulose acetate is finding an application as the inhibitor strip in rockets. Acetate butyrate is not in general use. Nylon is used for bearings and wire jacketing. Polyethylene is most widely used in applications where its chemical inertness is advantageous. Several applications are rocket igniter cups and wire coatings. Polytetrafluoroethylene chloride resins are very much of interest, but are new and in short supply. The capacity on polyvinyl chloride is considered good and may not be seriously short in supply. Polyvinyl alcohol film is used as barrier material for oils and war gases. Polyvinyl butyral should be plentiful and is being used in laminated acrylic sandwiches for enclosures. Polystyrene is in short supply because of the rubber program. The use of polystyrene in war material is somewhat limited because of its properties. Alkyd molding compounds are too new for a wide usage and lack a background in application and performance characteristics. Melamine materials have poor stability of dimension and their applications are limited for this reason. Great emphasis is being placed on polyester glass laminate for various molded and laminated shapes. The urea compounds will probably be available but there are no special new applications. The Epon resins are of great interest, but relatively new.

Government spending for defense has jumped from 2.7 billion per month to 3 billion. The bulk of it is going to aircraft with ordnance and food second in line. Other large expenditures are being made for vehicles, radar, guided missiles and the Navy. The Department of Commerce publishes daily a list of invitations to bid. In general, these are the straightforward established items which do not involve any changes or further developmental work. A weekly summary of contract awards is also published. The Society of the Plastics Industry has available a list of contract awards. The State of Massachusetts publishes weekly a list of contract awards. Work involving development or new material or processes is not usually made public and contracts are generally awarded through firsthand contacts with the proper department.

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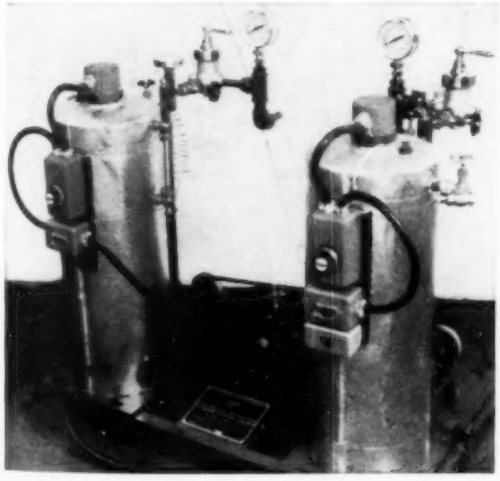

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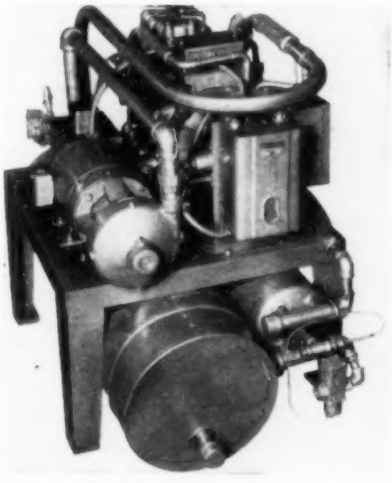

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NEW YORK REVIEWS 1950 EVENTS

Baron, Wessinger, Ward Are New Officers

BY A. M. MERRILL

The New York Section held its second annual Christmas party on December 20 at the Hotel Shelburne. Some 55 members and guests of the group attended the party which included a cocktail hour, dinner, and entertainment program. Music and songs were provided by the Barry Trio, and the after-dinner entertainment featured Fred Rohner. Mr. Rohner displayed his ability as a card magician and also showed remarkable talents as a pickpocket, with four members of the Section acting as somewhat reluctant participants in the act.

Following the dinner, retiring president Sam Silberkraus, Riverdale Laboratory, reviewed the Section's accomplishments during the past year and thanked the members for their cooperation in the group's continued growth. Mr. Silberkraus also announced the new officers for 1951, as follows: president, George Baron, Ideal Plastics Corp.; vice president, Bruno E. Wessinger, Wess Plastic Molds, Inc.; and secretary-treasurer, Winslow A. Ward, American Cyanamid Co. The following new directors were elected in a recent mail balloting to serve three-year terms: Saul Blitz, Noma Electric Corp.; Russell H. Skidmore, Celanese Corp. of America; and Arthur M. Merrill, "India Rubber World."

Table favors were distributed through the courtesy of Koppers Co., Inc., and Renwal Mfg. Co., Inc., and the party closed with a drawing for grab bag prizes brought by the members and door prizes contributed by F. J. Stokes Machine Co., H. Muehlstein & Co., Noma Electric Corp., and Wess Plastic Molds, Inc. The party was voted a huge success, and much credit is due the arrangements committee under the chairmanship of Mr. Ward, and including Martin J. Voegtlen, Celanese Corp. of America; Walter Merck, M. W. Kellogg Co.; and Nicholas V. Fasano, Washington Molding Co.

The Section will not hold a meeting during January in order to prevent any interference with the National Technical Conference on January 18-20. The next regular dinner meeting of the New York group will take place on February 21 at the Hotel Shelburne. Speakers at this meeting will be Stanley R. Melvin, Monsanto Chemical Co., on "Post-Molding Treatment of Thermoplastics," and Rolland L. Jenkins, Canadian Radium & Uranium Corp., on "Radio-Active Static Eliminators for Thermoplastics."

MIAMI OFFICERS CHOSEN FOR 1951

BY BYRON NELSON

Miami Valley Section has actively begun the new year with a new slate of officers and Directors. Martin H. Kasch, Sales Engineer, Kurz-Kasch, Inc., is President; Byron W. Nelson, Head Plastics Lab., N.C.R. Co. is Vice-President; Carl Weber, Crosley Div. Manager, Avco Corp., Secretary; Charles Selz, Kurz-Kasch, Inc., Treasurer; and Walter G. Oelman, Standard Molding Corp., National Director.

Newly elected Directors to serve during 1951 and through 1953 are Carl Weber, Ralph Backscheider, Engineer, Recto Molded Products, Inc. Cincinnati, O. and Otto Fiedler, Plastic Supt. F & F Mold & Die Works. Holdover Directors are Byron Nelson, Charles Selz, and Merle Nelson, Plastic Moldings Corp., Cincinnati, O. all 2 years each; and Robert W. Gerdes, Martin Kasch, and John Brierley, Bakelite Corp., all 1 year each.

On January 4 the Crosley Div. Avco Corp. was host to Miami Valley Members with a dinner and plant visit. Carl Weber and Merle Nelson were the co-chairmen. At this meeting retiring President Robert W. Gerdes paid tribute to his fellow retiring officers for 1950 and turned the gavel over to Martin Kasch and asked continued support by the members for his successor.

The annual Christmas party was a huge success. Thanks go to the hard workers responsible for the best party to date. These were Jack Braden, Walter Oelman, John Brierley, Martin Kasch, Charles Selz and Robert Gerdes. 80 were in attendance with the wives enjoying themselves by running off with the majority of the Bingo prizes. Winners included Mrs. Carl Greiner, Mrs. M. Kasch, Mrs. Merle Nelson, Mrs. Fiedler, Marvin Winemiller, G. J. Wilson, Harold Brouse, Mrs. Dave Meeker, Mrs. Waldron, Mrs. Bice, and Mrs. Backscheider.

Favors were distributed by the F & F Mold & Die Works and the Formica Insulation Co. A very tasty buffet supper was served at the evening's close.

Miami Valley Section will be represented at the 7th Annual Technical Conference by Robert Gerdes, Byron Nelson and Walter Oelman.

CLEVELAND WINNERS

BY R. J. O'HARA

The Annual Christmas Party of the Cleveland-Akron Section, Society of Plastic Engineers was held December 11th at the Aurora Inn, Aurora, Ohio. Pre-dinner cocktails were served to members and their guests, courtesy of the section, with the accompaniment of a roving accordionist assisted intermittently by President Van Orman and his harmonica.

Preceding the Duncan Hines dinner Mr. M. W. Osborne, in charge of the local Prize Paper Contest, announced that the judging committee, headed by Mr. Hugh Winn, had chosen Mr. George Blum's paper entitled "Industrial Applications of Polyethylene" as winning first prize in the Cleveland-Akron Section. Mr. Blum is Professor of Chemical Engineering at Case Institute of Technology.

Runner-up in the contest was Mr. A. R. Morse of Injection Molders Supply Co., with his paper "Production Aids for the Injection Molder." Both papers have been submitted for consideration in the National Prize Paper Contest.

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(Continued from page 5)

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Services: Toy manufacturers.
Representatives: Messrs. Jacobs, Raff.

TECH-ART PLASTICS CO., INC.
35-42 Forty-Second St., Long Island City 1, N.Y.
Services: Compression, transfer, and injection molders.
Representatives: Messrs. Keusch, Bergen.

THOMAS MFG. CORP.
80 Clinton St., Newark 5, N.J.
Services: Mold toys.
Representatives: Messrs. Thomas, Naturale.

MOLDMAKERS

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2401 Schaefer Rd., Melvindale, Mich.
Services: Beryllium copper cavities.
Representatives: Messrs. Nichols, Healey.

NEWARK DIE CO.
24 Scott St., Newark, N.J.
Services: Moldmakers.
Representatives: Messrs. Gryce, Spitzig.

PROCESS MOLD CO.
11471 Kercheval St., Detroit 14, Mich.
Services: Beryllium copper cavities.
Representatives: Messrs. Koons, Chapman.

WILPET ENGINEERING & MFG. CO.
244 Dukes St., Kearny, N.J.
Services: Moldmakers; Injection molders.
Representatives: Messrs. Pfaff, Niclaus.

Table favors and door prizes for the annual SPE banquet on January 19th have been provided through the generosity of the following companies:

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Industry Notes

300 OZ. MACHINE

The Watson-Stillman Co., Roselle, N. J. have just announced the completion of the gigantic 300 ounce capacity machine, the largest injection molding machine ever built. Fully hydraulic, this machine is equipped with manual as well as automatic single cycle control and adjustable speed control of the injection ram and individual adjustable control of injection and clamping pressures. Some of its features are: 300 ounce per shot capacity; 1,500 tons clamping pressure; a platen area which will accommodate a 4 feet by 6 feet mold; 4 ft. (maximum) stroke and 6 ft. daylight opening.

The Amos Molded Plastics, Division of Amos Thompson Corp., Edinburg, Indiana and General American Transportation Corp., Chicago, Illinois are about to go into production with this new machine.

BLENDER

A new dry blending equipment catalog entitled, "The Patterson Conical Blender," has just been released by the Patterson Foundry & Machine Co., East Liverpool, Ohio. The publication includes installation photographs and information on the application of their blenders to dry blending operations.

KEL-F INFORMATION

A new Technical Bulletin (No. 4-16-50) containing information on the properties and methods of applying Kel-F (trifluorochloroethylene thermoplastic) dispersions has just been issued by the Chemical Manufacturing Division of The M. W. Kellogg Company, refinery and chemical engineers of Jersey City, New Jersey.

Giving detailed data on the characteristics of this new product, the bulletin points out that Kel-F dispersions may be applied by spraying, dipping or brushing. This bulletin describes means for applying these dispersions; includes properties of the first two of a series, and suggests fusion operations.

At the same time, Kellogg announces that it has revised Technical Bulletins No. 2 and 3 which include data on the modification of Kel-F properties resulting from heat treatment and molding techniques respectively.

NEW VAN DORN PRESS

To achieve mass production of smaller plastic parts at low cost, The Van Dorn Iron Works Co., 2685 East 79th Street, Cleveland 4, Ohio, has recently added a semi-automatic press to its line. Known as Model H-200, it has a 2-ounce capacity and molds practically all thermoplasties including nylon. It is claimed that a job can be set up on this press by one man in 20 minutes. Operating costs for 8 hours do not exceed one dollar.

A push button control box is mounted to the left of the operator and assures maximum accessibility. Simplified controls provide ease in hand setup or semi-automatic use.

HOLOFOL PROCESS

The new Holotol process, which makes possible the economical mass production of seamless hollow products from rubber, thermoplasties and cellulose derivatives, has been announced by Charles A. Randorf, Inc., 1807 Elmwood Avenue, Buffalo 7, N. Y., American representatives for the German manufacturer of the process. The process consists of the short chemical-physical treatment in a comparatively simple machine which splits in half the thickness of sheet (from .05 mm up) of the above materials, leaving the edges joined. Fully automatic, no mechanical fastening methods such as pasting, welding or sewing are used in the treatment.

BLAST CLEAN

The American Wheelabrator & Equipment Corp., 3 S. Byrkit St., Mishawaka, Indiana has prepared a heavily illustrated, eight page booklet, "Continuous Blast Cleaning Can Reduce Cleaning Costs," which explains the advantages offered by continuous airless abrasive blast cleaning and cites actual production figures for the five sizes of Wheelabrator Continuous Tumblasts.

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